REMARKS

Favorable reconsideration of this application is respectfully requested in view of the following remarks.

Claims 1-12 are pending.

Applicants appreciate the courtesies extended to Applicants' representative during the July 9, 2007 personal interview. The substance of the discussions are incorporated into the following remarks and constitute Applicants' record of the interview.

The Office Action rejects claims 1-6, 8 and 9 under 35 U.S.C. §102(b) over U.S. Patent No. 6, 074,180 to Khanwilkar et al. and claims 10-12 under 35 U.S.C. §103(a) over Khanwilkar. These rejections are respectfully traversed.

The claimed subject matter of this application pertains to a centrifugal blood pump apparatus. The centrifugal blood pump apparatus includes a housing having fluid inlet and outlet ports, a centrifugal pump section, including an impeller having a first magnetic material and rotatable inside the housing to feed a fluid by centrifugal force generated during rotation of the impeller, and an impeller rotation torque generation section for attracting and rotating the impeller. A hydrodynamic pressure groove is formed at a portion of an inner surface of the housing at an impeller rotation torque generation section or at a portion of a surface of the impeller at the impeller rotational torque generation section, with the impeller being rotatable without contacting the housing by virtue of the action of the hydrodynamic groove. In addition, an electromagnet is provided to attract the first magnetic material of the impeller, or a second magnetic material provided on the impeller separately from the first magnetic material, in a direction opposite to the direction in which the impeller

rotational torque generation section attracts the first magnetic material to help levitate the impeller.

Applicants respectfully disagree with the Office Action's observation that Khanwilkar discloses a pump including a hydrodynamic pressure groove embodied as the second impeller return chamber. At column 11, lines 16-18, Khanwilkar discloses that fluid flows entirely around impeller 21 via first return flow chamber 32 and second impeller return chamber 34. At paragraph 12, lines 27-39, Khanwilkar indicates that

> [A] portion of fluid pumped by impeller 21 returns from the region of high pressure near spiral volute 18 along both sides of impeller 21, via first impeller return chamber 32 and second impeller return chamber 34, as reverse flow to region of lower pressure near impeller intake opening 30. Fluid returning along second impeller return chamber 34 also passes through impeller return opening 36, and thereby serves to equalize internal pressure. The width of impeller return chambers 32 and 34 are calculated by a precise balance of primary fluid flow and reverse flow, such that fluid does not stagnate within the pump but also does not possess unnecessary inefficiencies.

See, also, column 12, lines 64 through column 13, line 6, and column 18, lines 47-56, as well as Figs. 3 and 8.

Thus, Khanwilkar merely discloses that the feature identified by reference numeral 34 is a chamber and not a groove. The American Heritage Dictionary, Second College Edition, 1982, defines "chamber" as "an enclosed space or compartment; cavity." The enclosed space or compartment formed by Khanwilkar's chamber 34 is not a groove, and certainly is not a groove formed at a portion of a surface of a housing/impeller as claimed.

The second impeller return chamber 34 in Khanwilkar is formed by the lower surface of the impeller and upper surface of a second pump housing half 14. On the

other hand, as discussed in the present specification at page 11, line 30, et seq., due to the hydrodynamic bearing effect generated between the hydrodynamic pressure groove 38 and the bottom surface of the impeller 21 or between the dynamic pressure groove formed on the surface of the impeller 21 at the rotor-disposed side thereof and the inner surface of the housing, the impeller 21 rotates without contacting the inner surface of the housing 20, with the impeller 21 spaced at a slight interval from the inner surface of the housing 20. Thereby, a blood passage can be secured between the bottom surface of the impeller 21 and the inner surface of the housing 20, making it possible to inhibit blood from staying therebetween and thrombus from occurring. In addition, because the hydrodynamic pressure groove 38 displays a blood stirring action between the bottom surface of the impeller 21 and the inner surface of the housing 20 in a normal state, it is possible to inhibit blood from staying therebetween.

The remaining dependent claims are allowable for at least the reasons discussed above, as well as for the individual features they recite. Withdrawal of the rejection of the dependent claims are respectfully requested.

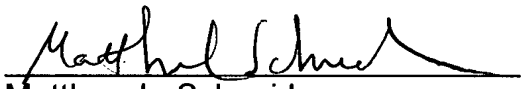
Early and favorable action with respect to this application is respectfully requested.

Should any questions arise in connection with this application or should the Examiner believe that a telephone conference with the undersigned would be helpful in resolving any remaining issues pertaining to this application the undersigned respectfully requests that he be contacted at the number indicated below.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: July 10, 2007

By: 

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